Interim Guidelines on Dust Palliative Use in Clark County, Nevada

State of Nevada
Department of Conservation & Natural Resources
Division of Environmental Protection

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Interim Guidelines on Dust Palliative Use in Clark County

BACKGROUND

In response to direction from the Legislature and SB432, the Nevada Division of Environmental Protection (NDEP) is providing the following interim policy on dust palliative use in Clark County. This document is based largely on the recommendations of the Dust Palliative Working Group which consists of air and water quality professionals (including two representatives from the Division) and which was formed at the request of Commissioner Erin Kenny to provide recommendations regarding the use of dust suppressants (palliatives) in the Las Vegas Valley.

The working group has met several times over the last few months and has found a number of existing laws and codes which it believes may be applicable to the use of dust palliatives and the protection of human health and the environment (see following section, "Regulatory Basis for Interim Guidance"). However, because the environmental impacts of the various dust suppressant products currently remain uncertain, the working group believes, and NDEP concurs, that it would not be prudent to recommend or deny the use of such products based solely on the aforementioned regulations. Thus, in addition to state regulations, some incorporated recommendations are also based on information currently available in the scientific literature.

With that in mind, the following document represents the best professional thinking of NDEP and the members of the working group and was written to fulfill the need for an interim policy outlining guidelines and procedures that should be followed to ensure that the public comply with the new Clark County Air Quality regulations (effective January 1, 2001) in a manner that minimizes adverse environmental impacts. Its objective is to facilitate the implementation of air quality fugitive dust controls in a manner that prevents human exposure to harmful constituents and protects soil and water resources while achieving air quality objectives. It should be noted that the recommendations contained in these guidelines are based on conditions in the Las Vegas Valley.

Both NDEP and the working group recognize the fact that the use of dust palliatives in Clark County is a dynamic issue and questions and concerns from the public will undoubtedly remain. This *Interim Policy*, therefore, is expected to be revised in the future to reflect public comments, advanced thinking of the working group, and the changing technology of the construction industry. Likewise, it is anticipated that the results of a UNLV Research Study, currently underway, will provide an extensive scientific evaluation on the water quality impacts of dust palliatives. The Dust Palliative Working Group has committed to continue to meet on a regular basis to review and evaluate the results of this study and other pertinent information relating to the environmental impacts of dust palliative use. It is envisioned that, ultimately, a permanent policy or set of regulations will be developed if such action is deemed necessary and that this policy/set of regulations will be more comprehensive in scope.

Regulatory Basis For Interim Guidance

NAC 445A.2272	**Contamination of soil: Establishment of action levels**
NAC 445A.22735	**Contamination of groundwater: Establishment of action levels**
NAC 445A. 2275	**Contamination of surface water**
NRS 444.8565	**"Hazardous Waste" defined**
NRS 444.861	**"Used Oil" defined**
NRS 444.8632	**Compliance with federal regulations adopted by reference.**
NRS 444.8682	**Requirements for managing and disposing of mixtures of used oil and hazardous waste or other products**
NRS 444.8683	**Regulation of mixtures of used oil with wastes determined not to be hazardous**
NRS 444.8681	**Mixing of used oil with hazardous waste or products**

COMPLIANCE

Application of dust palliatives may be subject to sample collection and testing for compliance with applicable regulations of the Nevada Administrative Code and the Nevada Revised Statues. The Nevada Division of Environmental Protection may conduct sample collection.

ENVIRONMENTAL GUIDELINES

Prohibited and Severely Restricted Materials

The materials and compounds listed below should never be present in any dust suppressant product at detectable levels:

1) Banned Pesticides:[1]

- **aldrin**
- **chlordane**
- **DDT**
- **DDE**
- **DDD**
- **Methoxychlor**
- **Dieldrin/endrin**

[1] References: a) United States Environmental Protection Agency - Office of Pesticide Programs http://www.epa.gov/oppfead1/international/piclist.htm
b) The Merck Index, eleventh edition, Merck and Company, Rahway, N. J., 1989
c) Environmental Chemistry, Manahan, S. Lewis Publisher, 1994.
d) Hazardous Wastes, Watts. R. Wiley Interscience, 1997.
e) Hazardous Waste Management, La Grega, M. McGraw Hill, 1994.

- **Heptachlor**
- **Hexachlorobenzene**
- **Lindane (γ-BHC)**
- **4. 2,3,4,5-Bis(2-butylene)tetrahydro-2- furaldehyde (Repellent-11)**
- **bromoxynil butyrate**
- **cadmium compounds**
- **calcium arsenate**
- **carbon tetrachloride**
- **chloranil**
- **chlordecone (kepone)**
- **chlorinated camphene [Toxaphene]**
- **chloromethoxypropylmercuric acetate (CPMA)**
- **copper arsenate**
- **DBCP**
- **Di(phenylmercury)dodecenylsuccinate (PMDS)**
- **EPN**
- **ethyl hexyleneglycol (6-12)**
- **lead arsenate**
- **leptophos**
- **mevinphos**
- **mirex**
- **nitrofen (TOK)**
- **OMPA (octamethylpyrophosphoramide)**
- **phenylmercury acetate (PMA)**
- **phenylmercuric oleate (PMO)**
- **potassium 2,4,5-trichlorophenate (2,4,5-TCP)**
- **pyriminil (Vacor)**
- **safrole**
- **silvex**
- **sodium arsenite**
- **TDE**
- **Terpene polychlorinates (Strobane)**
- **thallium sulfate**
- **vinyl chloride**

2) Severely Restricted Pesticides[2]

- **arsenic trioxide**

[2] References:
a) United States Environmental Protection Agency - Office of Pesticide Programs http://www.epa.gov/oppfead1/international/piclist.htm
b) The Merck Index, eleventh edition, Merck and Company, Rahway, N. J., 1989
c) Environmental Chemistry, Manahan, S. Lewis Publisher, 1994.
d) Hazardous Wastes, Watts. R. Wiley Interscience, 1997.
e) Hazardous Waste Management, La Grega, M. McGraw Hill, 1994.

- **carbofuran (granular only)**
- **daminozide/alar**
- **sodium arsenate**
- **tributyltin compounds**

3) **Dioxins**
4) **Asbestos**
5) **PCBs**

_p_H Limits

It is recommended that all dust suppressant products should have a _p_H value of not less than four (_p_H = 4) or greater than nine (_p_H = 9) as applied.

GENERAL USE GUIDELINES

Open Bodies of Water and Drinking Water Well-Heads:

Use of organic petroleum products, deliquescent/hygroscopic salts, and lignin-based palliatives are highly discouraged within twenty (20) yards of open bodies of water, including lakes, streams, canals, and drinking water well-heads. This buffer zone is intended to prevent leachate from these palliatives from reaching an open body of water or a ground water aquifer.

Natural Washes and Flood Control Channels:

Use of organic petroleum products, deliquescent/hygroscopic salts, and lignin-based palliatives are highly discouraged within twenty (20) yards of natural washes and flood control channels. This buffer zone is intended to prevent leachate from these palliatives from reaching a natural wash or flood channel, and subsequently being flushed into surface waters or drinking water supplies.

Surfactants:

Use of surfactants containing phosphates is highly discouraged because of adverse impacts on water quality. Surfactants by themselves are not allowed for use as a dust palliative because they do not form a durable soil surface. Non-phosphate surfactants may be combined with dust palliatives to assist penetration of dust palliatives into hydrophobic soils.

Pesticide Application With Dust Palliatives:

Any person who applies any pesticide material with a dust palliative is required to hold a valid pesticide applicators license issued by the State of Nevada.

Dust Palliative Dilution and Tank Cleaning:

Dust palliative applicators should be aware that use of water tainted with any of the above-listed prohibited or severely restricted chemicals, or with other compounds that would result in a violation of applicable codes and regulations, for the dilution of dust palliatives could result in a palliative mixture that would not comply with applicable environmental regulations. Only potable water supplies or reclaimed water – meaning wastewater that, as a result of appropriate treatment, is suitable for subsequent beneficial use – should be used as a diluent for dust suppressants. Application or transport tanks that have been used for other purposes, such as pesticide use, must be cleaned in accordance with applicable regulations before being used to transport, mix, or apply a dust palliative.

Application Guidelines – Traffic Area Applications:

1. **Fiber mulch products should not be used for use as a dust palliative in traffic areas. These products do not hold up well for traffic use.**

2. **Non-phosphate surfactants may be combined with dust palliatives to assist penetration into hydrophobic soils. Surfactants by themselves are not recommended for use as a dust palliative because they do not form a durable soil surface. Surfactants should not contain phosphates because phosphates adversely impact water quality.**

3. **Use of deliquescent/hygroscopic salts should be limited to magnesium chloride and only used for short-term (less than one year) stabilization of unpaved roads. Treated unpaved roads must be periodically maintained with additional applications of water and magnesium chloride as needed to maintain effectiveness. Magnesium chloride is not effective, even with product reapplication, for periods of more than one year. Magnesium chloride should not be used on trafficked areas within twenty (20) yards of an open body of water, a drinking water well-head, natural or artificial drainage channel, or other surface water feature.**

Application Guidelines – Non-Traffic Area Applications:

1. **Organic petroleum products, including modified and unmodified asphalt emulsions, should not be used on non-traffic areas. These palliatives are subject to NAC 445A.2272(b) and may discolor the land surface and produce unpleasant odors.**

2. **Use of deliquescent/hygroscopic salts are highly discouraged for non-traffic stabilization. These salts require frequent re-watering to be effective in the Las Vegas Valley, are not effective for periods of more than one year, and tend to leach chlorides when precipitation occurs.**

3. **Lignin-based palliatives are not recommended for non-traffic stabilization. Surface binding action of lignin-based palliatives may be reduced or completely destroyed when heavy rains occur. The decreased binding action of these products following heavy rains renders areas treated with lignin-based palliatives vulnerable to wind erosion after rain occurs. Leachate from lignin-based palliatives may also adversely impact the quality of storm water runoff.**

4. **Non-phosphate surfactants may be combined with dust palliatives to assist penetration of into hydrophobic soils. Surfactants by themselves are not recommended for use as a dust palliative because they do not form a durable soil surface. Use of surfactants containing phosphates is highly discouraged because phosphates adversely impact water quality.**

TABLE 1

TRAFFIC AREA APPLICATION REQUIREMENTS

Appropriate Use of Liquid Dust Palliatives and Application Rates

(Traffic Area: Any land area upon which vehicular traffic is reasonable expected to occur due to location, topography or access)

Dust palliative materials should conform to all applicable Environmental Guidelines and General Use Recommendations**o duct Type**	**Use/Treatment**	**Dilution Ratio Range Typical**	**Application Rate gallon/yd^2**	**Notes**
Synthetic polymers: polyvinyl acetate vinyl acrylic	**Topical Road or parking lot** **Topical Road shoulder** **Windrow Road surfaces**	**1:12-1:4 1:9** **1:12-1:4 1:9** **1:12-1:4 1:9**	**0.50** **0.50** **0.25/0.25/0.50**	**1,2,3,4**
Organic petroleum products: modified & unmodified asphalt emulsions	**Topical Road or parking lot** **Topical Road shoulder** **Windrow Road surfaces**	**1:8 1:4** **1:10 1:7** **1:8 1:4**	**0.50** **0.25** **0.40**	**1,2,3,4,5** **1,2,3,4,5** **1,2,3,4,5**
Magnesium chloride only. Other deliquescent/ hygroscopic salts, including calcium chloride and	**Topical Road or parking lot** **Topical Road shoulder-not Allowed** **Windrow Road surfaces**		**0.50** **0.25/0.25**	**1,2,3,4,6,8,9** **1,2,3,4,6,8,9, 10** **1,2,3,4,6,8,9**

sodium chloride are not permitted								
Fibers/Mulches		**Not Recommended Unpaved Road and other Traffic Applications**		**Not Applicable**		**Not Applicable**		**12**
Lignin-Based Types (Lignosulfonate)		**Topical Road or parking lot Topical Road shoulder Windrow Road surfaces**		**1:1 1:1 1:7-1:4 1:4 1:1 1:1**		**0.50 to 1.00 0.15 to 0.20 0.25/0.25 to 50/0.50**		**1,2,3,4,5 1,2,3,4,5 1,2,3,4,5**
Organic non-petroleum products: animal fats, molasses/sugar beet, tall oil emulsions, vegetable oils		**Topical Road or parking lot Topical Road shoulder Windrow Road surfaces**		**1:10 -1:2 1:5 1:10 -1:2 1:5 1:2- 1:1 1:1**		**1.00 1.00 0.15/0.15**		**1,2,3,4,5 1,2,3,4,5 1,2,3,4,5**
Other		**As approved by Control Officer**						

TABLE 2

NON-TRAFFIC AREA APPLICATION REQUIREMENTS

Appropriate Use of Liquid Dust Palliatives and Application Rates

(Non-Traffic Area: Any land area upon which no vehicular traffic is reasonable expected to occur due to site specific conditions; e.g., remoteness, fencing or other access controls)

Dust palliative materials should conform to all applicable Environmental Guidelines and General Use Recommendations

Product Type		Use/Treatment		Dilution Ratio Range Typical		Application Rate gallon/yd^2		Notes
Synthetic polymers: Polyvinyl acetate Vinyl acrylic		**Topical Vacant Land**		**1:12-1:4 1:9**		**0.50**		**1,2,3,4**
Organic petroleum products: modified & unmodified Asphalt emulsions		**Not Recommended Vacant Land**		**Not Applicable**		**Not Applicable**		**10**

Deliquescent/ Hygroscopic salts: Magnesium chloride Brine, calcium chloride brine or flakes, sodium chloride		**Not Recommended Vacant Land**		**Not Applicable**		**Not Applicable**		**10**
Lignin-Based Types (Lignosulfonate)		**Not Recommended Vacant Land**		**Not Applicable**		**Not Applicable**		**10**
Fibers/Mulches		**Topical Vacant Land**		**As prepared**		**500-6000**		**1,2,3,4,11**
Organic non-petroleum products: animal fats, molasses/sugar beet, tall oil emulsions, vegetable oils		**Topical Vacant Land**		**1:10-1:2 1:5**		**1.00**		**1,2,3,4,5**
Other		**As approved by Control Officer**						

NOTES (See last column in preceding Application Guideline tables)

1. **Topical application rates shown are to obtain ½ to 1 inch of penetration. Higher application rates should be used if greater penetration is needed. Windrow rate show is to give sufficient penetration to from a 4-6 inch thick temporary travel surface.**
2. **The dilution ratio (concentrate: water) is variable, and should be appropriate for the intended use, and local soil and weather conditions, as proposed by the Contractor and agreed upon by the Control Officer. Warranty conditions in Note 4 apply, '**
3. **Application rate of mixed solution at the typical dilution ratio. Lifetime conditions in Note 4 apply. For windrow applications, the rates separated by slash marks indicate the first/second/third application. First application is after removal of windrow. Second application is after replacement of windrow. Third application, if needed, is after second application.**
4. **Application of diluted suppressant should be sufficient to achieve a minimum warranted lifetime of one year from date of application.**

5. **These palliatives are subject to NAC 445A.2272(b) and may discolor the land surface and produce unpleasant odors.**
6. **Must be periodically maintained with additional applications of water and salt to maintain effectiveness. Allowed only for short-term (< 1 year) stabilization of unpaved roads. Should not be used on trafficked areas within twenty (20) yards of a drinking water well-head, natural or artificial drainage channel or other surface water feature.**
7. **Surfactants may be added to assist penetration of water and dust palliative into hydrophobic soils. Surfactants by themselves should not be used as dust palliatives. Surfactants should be free of phosphates.**
8. **Brine strength may vary as supplied from manufacturer, but is typically in the range of 20-40% solids by mass. Maximum and minimum allowable strengths should be set in accordance with manufactures recommendations.**
9. **Sodium chloride (NaCl) should not be used for any application, because it is ineffective at ambient relative humidity below 76%. Relative humidity above 50% seldom occurs in the Las Vegas Valley.**
10. **Deliquescent/hygroscopic salts should not be used for use on vacant lands or on road shoulders near surface waters or surface drainage because of adverse water quality impacts, including elevated chloride concentrations in storm water runoff and in groundwater.**
11. **Application rate in pounds per acre at the on-site blended strength.**
12. **Fiber mulches are not effective for traffic applications.**

LOSSARY OF TERMS AND DEFINITIONS

(Principal source: Bolander and Yamada, Dust Palliative Selection and Application Guide - US Department of Agriculture, November, 1999)

<u>Application rate</u> - For liquid suppressants, the volume of mixed solution (concentrate plus water) applied per unit area of land. Typical application rates range from 0.10 to 1.00 gallons of mixed solution per square yard (gallon/yd^2) of land.

<u>Application rate</u> - For fibers and mulches, the mass of solids in pounds applied per unit area of land. Typical application rates range from 500 pounds per acre to 6,000 pounds per acre.

<u>Brine</u> - Solution of salt in water. Strength of brine measured by percent solids by mass. For example, a 40% magnesium chloride brine has 40% solids by mass.

<u>Deliquescent salts</u> - Calcium chloride and magnesium chloride salts are deliquescent (readily drawing moisture from the atmosphere and melting). Calcium chloride is available as flake or brine. Magnesium chloride is available as brine. Brine solids contents are variable.

Dilution ratio - **The ratio of the volume of concentrate to volume of water. Example: 1:4 means 1 volume of concentrate is to be mixed with 4 volumes of water, or 100 gallons of concentrate would be mixed with 400 gallons of water.**

Dust Palliative - **A hygroscopic material, non-toxic chemical stabilizer or other dust palliative which is not prohibited for ground surface application by the EPA or the Nevada Division of Environmental Protection (NDEP) or any applicable law or regulation, as a treatment material for reducing fugitive dust emissions. Water, solutions of water and chemical surfactants, and foam are not dust palliatives for the purpose of these guidelines.**

Dust Suppressant - **Water, hygroscopic material, solution of water and chemical surfactants, foam, non-toxic chemical stabilizer or any other dust palliative which is not prohibited for ground surface application by the EPA or the Nevada Division of Environmental Protection (NDEP) or any applicable law or regulation, as a treatment material for reducing fugitive dust emissions.**

Fibers/mulches - **Blends of wood fiber or paper mulch with binder and/or tackifier in water. Fibers and mulches are usually blended on-site. Formulation types and concentrations are often proprietary and depend on soil conditions and intended use.**

Hygroscopic - **Readily drawing moisture from the atmosphere but not melting. Dry sodium chloride is hygroscopic.**

Lignosulfonate - **By-product of sulfite paper-making process. Available as 10-25% volumetric residual solution, as a 50% volumetric residual solution, or as powdered solid to be mixed with water. May have high initial BOD (biological oxygen demand).**

Organic non-petroleum products - **Tall oils; Distilled product of kraft (sulfate) paper-making process. Available as a 40-50% volumetric residual concentrate to be diluted with water.**

Organic non-petroleum products - **Vegetable oils; typical sources include canola oil, cottonseed oil, linseed oil and soybean oil. Applied full-strength at 0.25-0.50 gallon/yd^2.**

Organic petroleum products - **Available as cutback asphalt, asphalt emulsions, modified asphalt emulsions and other emulsified oils. Application rates highly variable, depending on road surface conditions, product type and dilution.**

Synthetic polymers - **By-products of adhesive manufacturing process. Available as 40-50% volumetric residual concentrate (40-60% solids by mass) in water, then diluted for application.**

Tackifier - A substance used with water to hold together mulches and other dust palliatives. A tackifier binds small particles together without forming a hard crust. Many dust palliatives can be used in a dilute form as a tackifier.

Topical - Liquid dust suppressant application technique using a hose, spray bay or spray cannon.

Windrow - Method of making a temporary road surface. A 4 to 6 inch thick layer of soil is scraped off the surface. The surface is treated with dust suppressant. The windrow is scraped back onto the surface and another treatment of dust suppressant is applied. A compaction step may be necessary.